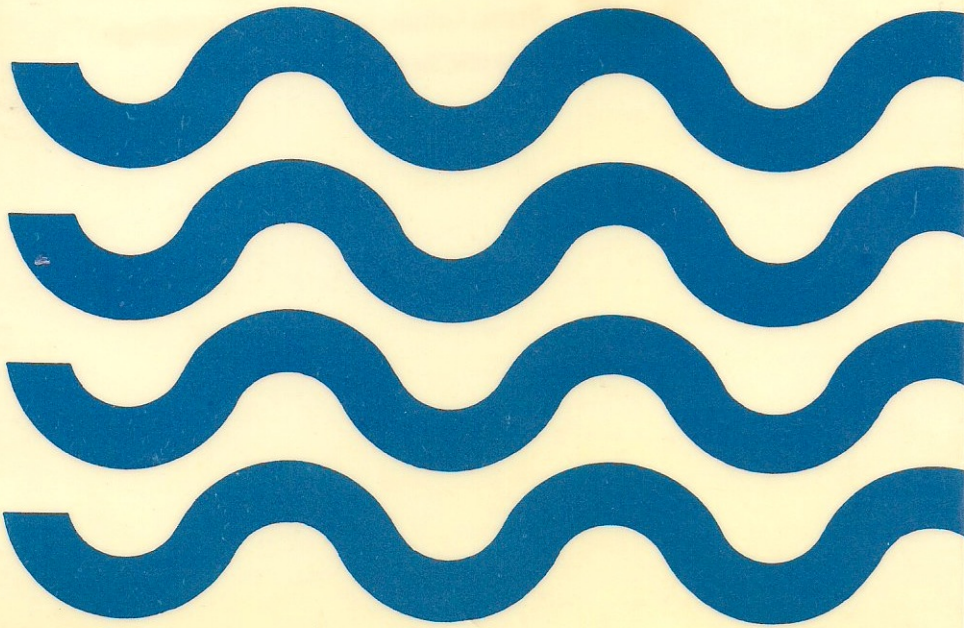
SCIENTIFICALLY SPEAKING

Oral Exercises



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SCIENTIFICALLY SPEAKING

Oral Exercises

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SCIENTIFICALLY SPEAKING

Oral Exercises

These oral exercises have been prepared for use as a complement to the recorded series 'Scientifically Speaking' with its accompanying textbook. They illustrate most of the structures studied in 'Scientifically Speaking', and provide further practice in the pronunciation of scientific formulae. Reference to the section *Structures of Scientific English* is particularly useful.

The exercises are designed to be used with the help of this booklet as it was considered that the length of the examples and their difficulty would make a text necessary for most students. But when the exercises have been completed several times, students should be able progressively to dispense with a text.

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1 PLASTICS

Exercise 1

Repeat these:

Man: Metals are more rigid than most plastics. (*Pause*)

Woman: Most plastics are poor conductors of heat and electricity. (*Pause*)

M: Thermoplastic materials do not lose their plasticity when heated. (*Pause*)

W: Hooke's law states that in an elastic material the ratio of stress to strain is constant. (*Pause*)

Exercise 2

Example:

W: We mould plastics.

M: Plastics are moulded.

W: We mould plastics. (*Pause*)

M: Plastics are moulded.

Exercise 2 (continued)

W: We join monomers to form polymers. (*Pause*)

M: Monomers are joined to form polymers.

W: We combine these substances with other chemicals. (*Pause*)

M: These substances are combined with other chemicals.

W: We modify the properties of plastics to suit different applications. (*Pause*)

M: The properties of plastics are modified to suit different applications.

W: We colour only the surfaces of metals, but mix pigments into the body of plastics. (*Pause*)

M: Only the surfaces of metals are coloured, but pigments are mixed into the body of plastics.

W: We shape thermosetting plastics by heating them in a mould only once. (*Pause*)

M: Thermosetting plastics are shaped by heating them in a mould only once.

W: We obtain urea-formaldehyde by combining urea with formaldehyde. (*Pause*)

M: Urea-formaldehyde is obtained by combining urea with formaldehyde.

Exercise 3

Say these formulae:

1. urea $NH_2.CO.NH_2$

   urea N H two C O N H two

2. formaldehyde CH_2O

   formaldehyde C H two O

3. melamine $C_3H_6N_6$

   melamine C three H six N six

4. ethylene $CH_2.CH_2$

   ethylene C H two C H two

5. propylene $CH_3.CH.CH_2$

   propylene C H three C H C H two

6. vinyl chloride $CH_2.CHCl$

   vinyl chloride C H two C H C l

7. acetic acid $CH_3.COOH$

   acetic acid C H three C O O H

Exercise 3 (continued)

8. dimethylamine $CH_3.NH.CH_3$

   dimethylamine C H three N H C H three

9. acrylic acid $CH_2.CH.COOH$

   acrylic acid C H two C H C O O H

10. diethyl ether $(C_2H_5)_2O$

    diethyl ether C two H five twice O

2 STEEL

Exercise 1

Example:

Man: Water boils. It gives off steam. (*As*)

Woman: As water boils, it gives off steam.

M: Water boils. It gives off steam. (*As*) (*Pause*)

W: As water boils, it gives off steam.

M: The molten metal is tapped. It is run into moulds. (*As*) (*Pause*)

W: As the molten metal is tapped, it is run into moulds.

M: The molten metal was tapped five minutes ago. It has cooled and solidified. (*Since*) (*Pause*)

W: Since the molten metal was tapped five minutes ago, it has cooled and solidified.

Exercise 2

Example:

W: Air passes over coke. Carbon monoxide is produced. (*As*)

M: As air passes over coke, carbon monoxide is produced.

W: Air passes over coke. Carbon monoxide is produced. (*As*) (*Pause*)

M: As air passes over coke, carbon monoxide is produced.

W: Steel sheet moves through the set of rolls. It becomes thinner at each pass. (*As*) (*Pause*)

M: As steel sheet moves through the set of rolls it becomes thinner at each pass.

W: Its carbon content is decreased. Steel becomes less hard and more ductile. (*As*) (*Pause*)

M: As its carbon content is decreased, steel becomes less hard and more ductile.

W: Metal cools. It contracts. (*As*) (*Pause*)

M: As metal cools, it contracts.

W: Steam reaches the critical pressure. The valve opens. (*As*) (*Pause*)

M: As steam reaches the critical pressure, the valve opens.

W: The first part of the factory was built in 1960. The factory has been extended twice. (*Since*) (*Pause*)

M: Since the first part of the factory was built in 1960, the factory has been extended twice.

W: The raw materials were charged at 6 a.m. Three hours have passed. (*Since*) (*Pause*)

M: Since the raw materials were charged at 6 a.m., three hours have passed.

Exercise 3

Example:

M: The slag floats on top of the molten metal. It can be tapped separately. (*As*)

W: As the slag floats on top of the molten metal, it can be tapped separately.

M: (*Since*)

W: Since the slag floats on top of the molten metal, it can be tapped separately.

M: The slag floats on top of the molten metal. It can be tapped separately. (*As*) (*Pause*)

W: As the slag floats on top of the molten metal, it can be tapped separately. (*Since*) (*Pause*)

W: Since the slag floats on top of the molten metal, it can be tapped separately.

M: Carbon monoxide can take up more oxygen to become carbon dioxide. It acts as a reducing agent. (*As*) (*Pause*)

W: As carbon monoxide can take up more oxygen to become carbon dioxide, it acts as a reducing agent. (*Since*) (*Pause*)

Exercise 3 (continued)

W: Since carbon monoxide can take up more oxygen to become carbon dioxide, it acts as a reducing agent.

M: The hydrocarbons have different boiling points. They can be drawn off separately. (*As*) (*Pause*)

W: As the hydrocarbons have different boiling points, they can be drawn off separately. (*Since*) (*Pause*)

W: Since the hydrocarbons have different boiling points, they can be drawn off separately.

Exercise 4

Example:

W: If it is alloyed with tin, copper forms a bronze.

M: If alloyed with tin, copper forms a bronze.

W: If it is alloyed with tin, copper forms a bronze. (*Pause*)

M: If alloyed with tin, copper forms a bronze.

W: Though it's an abundant element, aluminium is difficult to extract. (*Pause*)

M: Though an abundant element, aluminium is difficult to extract.

W: When they are heated under pressure, the constituents fuse. (*Pause*)

M: When heated under pressure, the constituents fuse.

W: When you're reporting these standard tests, do not repeat the test procedures. (*Pause*)

M: When reporting these standard tests, do not repeat the test procedures.

W: The lance is lowered. The cooling water is turned on. The oxygen is adjusted to full pressure. (*Pause*)

M: The lance is lowered, the cooling water turned on and the oxygen adjusted to full pressure.

W: The molten iron is charged. The converter is turned upright. A charge of limestone is added. (*Pause*)

M: The molten iron is charged, the converter turned upright and a charge of limestone added.

Exercise 5

Say these formulae:

1. $2C + O_2 = 2CO$

   two C plus O two equals two C O

2. 1300°C

   thirteen hundred degrees centigrade

3. −160°C

   minus one hundred and sixty degrees centigrade

Exercise 5 (continued)

4. 0.06%–0.12%

   nought point nought six per cent to nought point one two per cent

5. $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

   F e two O three plus three C O, yields two F e plus three C O two

6. Fe_3C

   F e three C

7. 3% Ni, 1% Cr

   three per cent nickel one per cent chromium

8. $<0.05\%$ S

   less than nought point nought five per cent sulphur

9. $>0.2\%$ C

   greater than nought point two per cent carbon

10. $2CO + O_2 \rightarrow 2CO_2$

    two C O plus O two yields two C O two

3 AIRCRAFT

Exercise 1

Example:

Man: The larger aircraft is slower than the smaller one.

Woman: The smaller aircraft is faster than the larger one.

M: The larger aircraft is slower than the smaller one. (*Pause*)

W: The smaller aircraft is faster than the larger one.

M: The laden aircraft has a higher take-off speed than the unladen one. (*Pause*)

W: The unladen aircraft has a lower take-off speed than the laden one.

M: The four-engined aircraft carries 60 more passengers than the twin-engined aircraft. (*Pause*)

W: The twin-engined aircraft carries 60 fewer passengers than the four-engined aircraft.

M: In horizontal flight the helicopter is less economical than the plane. (*Pause*)

Exercise 1 (continued)

W: In horizontal flight the plane is more economical than the helicopter.

M: Piston engines use less fuel than turbo-jets. (*Pause*)

W: Turbo-jets use more fuel than piston engines.

M: The fuselage of the modified type is two metres longer than that of the original types. (*Pause*)

W: The fuselage of the original types is two metres shorter than that of the modified type.

Exercise 2

Example:

W: The range of the aircraft is 5000 km.

M: The aircraft has a range of 5000 km.

W: The range of the aircraft is 5000 km. (*Pause*)

M: The aircraft has a range of 5000 km.

W: The maximum speed of the aircraft is 600 kilometres per hour in level flight. (*Pause*)

M: The aircraft has a maximum speed of 600 kilometres per hour in level flight.

W: The power/weight ratio of these engines is very high. (*Pause*)

M: These engines have a very high power/weight ratio.

W: The main runway is 5000 metres long. (*Pause*)

M: The main runway has a length of 5000 metres.

W: The capacity of the fuel tanks is 10000 litres. (*Pause*)

M: The fuel tanks have a capacity of 10000 litres.

W: The ceiling of these aircraft is 12000 metres. (*Pause*)

M: These aircraft have a ceiling of 12000 metres.

W: The external air temperature is −30 degrees centigrade. (*Pause*)

M: The external air has a temperature of −30 degrees centigrade.

Exercise 3

Now say these:

1. cruising speed: 1400 km/h

   cruising speed: fourteen hundred kilometres per hour

2. Flight No: XY 315

   flight number: X Y three one five

3. dep. 2200 hours : arr. 0300 hours

   depart twenty-two hundred hours arrive O three hundred hours

4. position: 24°N, 8°W

   position: twenty-four degrees north eight degrees west

Exercise 3 (continued)

5. aircraft type: LN 603

   aircraft type: L N six O three

6. free luggage allowance: 20 kg

   free luggage allowance: twenty kilogrammes

7. compass direction: 023°

   compass direction: O two three degrees

8. geographical directions: NW, SE, NE, SW

   geographical directions: north-west south-east north-east south-west

9. range: 3000–3500 km

   range: three thousand to three thousand five hundred kilometres

10. rate of descent: 120 m/min

    rate of descent: a hundred and twenty metres per minute

4 NUCLEAR POWER

Exercise 1

Example:

Man: What drives the turbine?

Woman: High pressure steam from the main boiler.

M: The turbine is driven by high pressure steam from the main boiler.

W: What drives the turbine?

M: High pressure steam from the main boiler. (*Pause*)

W: The turbine is driven by high pressure steam from the main boiler.

M: What increases the voltage?

W: A set of transformers. (*Pause*)

M: The voltage is increased by a set of transformers.

W: What powers the auxiliary pump?

M: A diesel engine. (*Pause*)

W: The auxiliary pump is powered by a diesel engine.

Exercise 1 (continued)

M: What drives the fan?

W: A separate electric motor. (*Pause*)

M: The fan is driven by a separate electric motor.

W: What controls the input flow of gas?

M: A reducing valve. (*Pause*)

W: The input flow of gas is controlled by a reducing valve.

M: What determines the output?

W: The level of demand on the total system. (*Pause*)

M: The output is determined by the level of demand on the total system.

Exercise 2

Example:

M: How are any leaks detected?

W: A device relays information to the control desk.

M: Any leaks are detected by means of a device which relays information to the control desk.

W: How are any leaks detected?

M: A device relays information to the control desk. (*Pause*)

W: Any leaks are detected by means of a device which relays information to the control desk.

M: How is the internal temperature measured?

W: Internal thermocouples are connected to external meters. (*Pause*)

M: The internal temperature is measured by means of thermocouples which are connected to external meters.

M: How are fuel rods exchanged?

W: A mechanism extracts each spent rod and inserts a new one automatically. (*Pause*)

M: The fuel rods are exchanged by means of a mechanism which extracts each rod and inserts a new one automatically.

Exercise 3

Say these formulae:

1. $\sin \omega t$

   sine omega t

2. $\omega = \frac{2\pi}{T}$

   omega equals two pi by T

3. $a_0 + j\omega_0$

   a nought plus j omega nought

Exercise 3 (continued)

4. $e^{-j\omega}$

   e to the minus j omega

5. $\dfrac{kp}{1 + ap + bp^2}$

   k p over one plus a p plus b p squared

6. $\dfrac{\sin \omega t}{\omega t}$

   sine omega t over omega t

7. $a\theta + b\dfrac{d\theta}{dt} = \theta_i$

   a theta plus b d theta by d t equals theta i

8. $\omega t = \dfrac{\pi}{2} + 2\pi n$

   omega t equals pi by two plus two pi n

9. $\cos \theta + j \sin \theta = e^{j\theta}$

   cos theta plus j sine theta equals e to the j theta

10. $1 \text{ MW} = 10^6 \text{W}$

    one megawatt equals ten to the six watts

5 OIL

Exercise 1

Example:

Man: The saturated solution is cooled. Crystals form.

Woman: If the saturated solution is cooled, crystals form.

M: The saturated solution is cooled. Crystals form. (*Pause*)

W: If the saturated solution is cooled, crystals form.

M: Pure volatile solvents are evaporated. No residue remains. (*Pause*)

W: If pure volatile solvents are evaporated, no residue remains.

M: The temperature of the gas rises. Its pressure increases. (*Pause*)

W: If the temperature of the gas rises, its pressure increases.

M: Crude oil is heated. Volatile hydrocarbons evaporate to leave a bituminous residue. (*Pause*)

Exercise 1 (continued)

W: If crude oil is heated, volatile hydrocarbons evaporate to leave a bituminous residue.

M: Heavy hydrocarbon vapours are passed over a hot catalyst. Some of the higher hydrocarbons are decomposed into more volatile hydrocarbons. (*Pause*)

W: If heavy hydrocarbon vapours are passed over a hot catalyst, some of the higher hydrocarbons are decomposed into more volatile hydrocarbons.

M: The middle fractions are cooled. Wax separates out from the oil. (*Pause*)

W: If the middle fractions are cooled, wax separates out from the oil.

M: Methane is cooled and compressed. It liquifies. (*Pause*)

W: If methane is cooled and compressed, it liquifies.

Exercise 2

Example:

M: Distillation is repeated. More fractions are obtained.

W: Distillation is repeated to obtain more fractions.

M: Distillation is repeated. More fractions are obtained. (*Pause*)

W: Distillation is repeated to obtain more fractions.

M: Crude oil is distilled. Several fractions are separated. (*Pause*)

W: Crude oil is distilled to separate several fractions.

M: The distillation products are further processed. They are made suitable for everyday use. (*Pause*)

W: The distillation products are further processed to make them suitable for everyday use.

M: The less volatile fractions are cracked. More of the lighter hydrocarbons are produced. (*Pause*)

W: The less volatile fractions are cracked to produce more of the lighter hydrocarbons.

M: The spent catalyst is cycled through a regenerator. It has to be cleaned. (*Pause*)

W: The spent catalyst is cycled through a regenerator to be cleaned.

M: Some products of the refinery go to the chemical industry. They are converted into plastics, detergents and other substances. (*Pause*)

W: Some products of the refinery go to the chemical industry to be converted into plastics, detergents, and other substances.

M: The main products of distillation may need purification. Sulphur, for example, has to be removed. (*Pause*)

W: The main products of distillation may need purification to remove sulphur, for example.

Exercise 3

Now repeat these:

1. If $n = 1$, C_nH_{2n+2} becomes CH_4

   If n equals one C n H two n plus two becomes C H four

2. If $n = 3$, $C_nH_{2n+1}Cl$ becomes C_3H_7Cl

   If n equals three C n H two n plus one C l becomes C three H seven C l

3. $Al_4C_3 + 12H_2O = 4Al(OH)_3 + 3CH_4$

   A l four C three plus twelve H two O equals four A l O H three plus three C H four

4. b.p. 98°C

   boiling point: ninety-eight degrees centigrade

5. sp. gr. 0.775/18°C

   specific gravity: nought point seven seven five at eighteen degrees centigrade

6. $CH_3I + 2H = CH_4 + HI$

   C H three I plus two H equals C H four plus H I

7. $2C_2H_5I + 2Na \rightarrow C_4H_{10} + 2NaI$

   two C two H five I plus two N a yields C four H ten plus two N a I

8. $(CH_3)_3C.C_2H_5$

C H three three C C two H five

6 CIVIL ENGINEERING

Exercise 1

Example:

Women: We're building the bridge.

Men: The bridge is being built.

W: We're building the bridge. (*Pause*)

M: The bridge is being built.

W: We're constructing a scale model of the bridge. (*Pause*)

M: A scale model of the bridge is being constructed.

W: We're encasing the girders in reinforced concrete. (*Pause*)

M: The girders are being encased in reinforced concrete.

W: We're attaching the suspenders to the cables. (*Pause*)

M: The cables are being attached to the suspenders.

W: They're raising the deck. (*Pause*)

M: The deck is being raised.

W: They're constructing the foundation of the dam. (*Pause*)

M: The foundation of the dam is being constructed.

W: They're boring a large tunnel. (*Pause*)

M: A large tunnel is being bored.

Exercise 2

Example:

M: We erected the towers.

W: The towers were erected.

M: We erected the towers. (*Pause*)

W: The towers were erected.

M: We tested the design in the wind tunnel. (*Pause*)

W: The design was tested in the wind tunnel.

M: We minimised the effect of winds. (*Pause*)

W: The effect of winds was minimised.

M: We carried out a number of tests on this material. (*Pause*)

W: A number of tests were carried out on this material.

M: They hoisted the sections into place. (*Pause*)

W: The sections were hoisted into place.

Exercise 2 (continued)

M: They welded the sections together. (*Pause*)

W: The sections were welded together.

M: As the valley was steep-sided we constructed a concrete dam. (*Pause*)

W: As the valley was steep-sided a concrete dam was constructed.

Exercise 3

Now repeat these:

1. $K = \dfrac{E}{3(1 - 2\sigma)}$

   K equals E over three into one minus two sigma

2. $\mu = \dfrac{E}{2(1 + \sigma)}$

   mu equals E over two into one plus sigma

3. $\sigma = \dfrac{\lambda}{2(\lambda + \mu)}$

   sigma equals lambda over two into lambda plus mu

4. $\sigma = \dfrac{E}{2\mu} - 1$

   sigma equals E over two mu minus one

5. $T = \dfrac{E\omega\bar{y}}{R}$

T equals E omega y bar all over R

6. $\frac{1}{2}M^2/EI$

a half M squared over E I

7. $\dfrac{dF}{dx} = -\omega$

d F by d x equals minus omega

8. $\dfrac{1}{128}\dfrac{\omega l^4}{EI}$

one over a hundred and twenty-eight times omega l to the four over E I

7 ELECTRONICS

Exercise 1

Example:

Man: If you make this device smaller, it'll be lighter.

Woman: This device will be lighter if it's made smaller.

M: If you make this device smaller, it'll be lighter. (*Pause*)

W: This device will be lighter if it's made smaller.

M: If you scale down the linear dimensions of the circuits, their time constant will be reduced. (*Pause*)

W: The time constant of the circuits will be reduced if their linear dimensions are scaled down.

M: If you pass too high a current through the transistors. they'll burn out. (*Pause*)

W: The transistors will burn out if too high a current is passed through them.

M: Only if you connect four such circuits in parallel will the reliability be adequate. (*Pause*)

W: The reliability will be adequate only if four such circuits are connected in parallel.

M: If you damage any one of its components, the whole series circuit may fail. (*Pause*)

W: The whole series circuit may fail if any one of its components is damaged.

M: If the circuit gives trouble, test the stability of the mains voltage. (*Pause*)

W: Test the stability of the mains voltage if the circuit gives trouble.

M: If you find that any of the printed circuits is faulty, discard it. (*Pause*)

W: Discard any printed circuit if it's found to be faulty.

Exercise 2

Example:

W: Time for response.

M: Response time.

W: Time for response. (*Pause*)

M: Response time.

W: Increase in speed. (*Pause*)

M: Speed increase.

W: Vehicle in space. (*Pause*)

M: Space vehicle.

Exercise 2 (continued)

W: Store of data. (*Pause*)

M: Data store.

W: Capacity for information. (*Pause*)

M: Information capacity

W: Path of current. (*Pause*)

M: Current path.

W: Dam made of concrete. (*Pause*)

M: Concrete dam.

W: Turbine operated by steam. (*Pause*)

M: Steam turbine.

Exercise 3

Now say these:

W: cathode-ray tube (*Pause*)

M: solid-state device (*Pause*)

W: automatic blind landing (*Pause*)

M: solid-state components (*Pause*)

W: micro-miniaturised components (*Pause*)

M: fluorescent neon tubes (*Pause*)

W: negative electric charge.

Exercise 4

Repeat these formulae:

1. $x^2 + y^2 = r^2$

   x squared plus y squared equals r squared

2. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

   x squared over a squared plus y squared over b squared equals one

3. $xy = k$

   x y equals k

4. $\frac{1}{x} + \frac{1}{y} = \frac{1}{a}$

   one over x plus one over y equals one over a

5. $\frac{1}{x + y} = \frac{1}{x} + \frac{1}{y}$

   one over x plus y equals one over x plus one over y

6. $e^{-j\theta} = \cos\theta - j\sin\theta$

   e to the minus j theta equals cos theta minus j sine theta

Exercise 4 (continued)

7. $\log_2 32 = 5$

   log of thirty-two to the base two equals five

8. $4! = 4 \cdot 3 \cdot 2 \cdot 1.$

   factorial four equals four times three times two times one

9. $\dfrac{n!}{x!(n-x)!}$

   factorial n over factorial x factorial n minus x

10. $\log x + \log y = \log xy$

    log x plus log y equals log x y

8 SHIPBUILDING

Exercise 1

Example:

Woman: A consumption of fuel that is uneconomic.

Man: An uneconomic fuel consumption.

W: A consumption of fuel that is uneconomic. (*Pause*)

M: An uneconomic fuel consumption.

W: A regulation made by the Government which is now amended. (*Pause*)

M: An amended Government regulation.

W: A computer for navigational purposes which is based on shore. (*Pause*)

M: A shore-based navigational computer.

W: A forecast of the weather in the locality. (*Pause*)

M: A local weather forecast.

W: Characteristics of a propeller which operates at high speed. (*Pause*)

Exercise 1 (continued)

M: High speed propeller characteristics.

W: A ship driven by nuclear power and designed for ice-breaking. (*Pause*)

M: A nuclear-powered ice-breaker.

W: A vessel designed for fishing in the deep seas. (*Pause*)

M: A deep-sea fishing vessel.

W: A tug powered by diesel engines and designed for work on the oceans. (*Pause*)

M: An ocean-going diesel-engined tug.

W: A signalling code which corrects errors automatically. (*Pause*)

M: An automatic error-correcting signalling code.

Exercise 2

Example:

M: We measure speeds of rotation. (*other devices*)

W: Speeds of rotation are measured by other devices.

M: We measure speeds of rotation. (*other devices*) (*Pause*)

W: Speeds of rotation are measured by other devices.

M: We measure electrical loads. (*watt meter circuits*) (*Pause*)

W: Electrical loads are measured by watt meter circuits.

M: We can transmit the information. (*radio*) (*Pause*)

W: The information can be transmitted by radio.

M: We control the movement of the cutting head. (*computer tape*) (*Pause*)

W: The movement of the cutting head is controlled by computer tape.

M: We measure temperatures. (*thermocouples and resistance thermometers*) (*Pause*)

W: Temperatures are measured by thermocouples and resistance thermometers.

Exercise 3

Say these formulae:

1. If $\frac{L}{l} = \frac{V^2}{v^2}$, then $\frac{R}{r} = \frac{L^3}{l^3}$

   If big L over little l equals big V squared over little v squared then big R over little r equals big L cubed over little l cubed

2. $a = k\sqrt{v} + a_0$

   a equals k root v plus a nought

3. If $v = 25$ and $k = 2$, then $a = 10$

   If v equals twenty-five and k equals two then a equals ten

Exercise 3 (continued)

4. $k^2 = k$ only if $k = 0$ or 1

   k squared equals k only if k equals nought or one

5. $a = k\sqrt{v} + a_0$

   a equals k root v plus a nought

6. $L \propto V^2$

   L varies as V squared

7. $R \propto L^3$

   R varies as L cubed

8. $R : r = L^3 : l^3$

   the ratio of big R to little r equals the ratio of big L cubed to little l cubed

9. 28°N, 32°W

   twenty-eight degrees north thirty-two degrees west

10. the wind is from the NNE

    the wind is from the north-north-east

9 COMPUTERS

Exercise 1

Man: We've found out how to programme the computer. (*learn*)

Woman: We've learned how to programme the computer.

M: We've found out how to programme the computer. (*explain*) (*Pause*)

W: We've explained how to programme the computer.

M: We've found out how to programme the computer. (*discover*) (*Pause*)

W: We've discovered how to programme the computer.

M: We've found out how to programme the computer. (*demonstrate*) (*Pause*)

W: We've demonstrated how to programme the computer.

M: We've found out how to programme the computer. (*decide*) (*Pause*)

W: We've decided how to programme the computer.

Exercise 2

W: It has been found out when to reduce the pressure. (*decide*) (*Pause*)

M: It has been decided when to reduce the pressure.

W: It has been found out when to reduce the pressure. (*discover*) (*Pause*)

M: It has been discovered when to reduce the pressure.

W: It has been found out when to reduce the pressure. (*explain*) (*Pause*)

M: It has been explained when to reduce the pressure.

W: It has been found out when to reduce the pressure. (*learn*) (*Pause*)

M: It has been learned when to reduce the pressure.

W: It has been found out when to reduce the pressure. (*demonstrate*) (*Pause*)

M: It has been demonstrated when to reduce the pressure.

Exercise 3

Say these now:

W: a relatively small computer (*Pause*)

M: a really powerful computer (*Pause*)

W: a functionally convenient means of storing information (*Pause*)

M: a digital general-purpose computer (*Pause*)

W: a punched-card reader (*Pause*)

M: a punched paper-tape reader (*Pause*)

W: a high speed printer (*Pause*)

M: a magnetic tape unit (*Pause*)

W: a vacuum tube machine (*Pause*)

M: an overall flow chart (*Pause*)

W: computer held files (*Pause*)

M: real time processing

Exercise 4

Example:

M: a chain for printing upper case letters only

W: an upper-case print chain

M: a chain for printing upper case letters only (*Pause*)

W: an upper-case print chain

M: a chain for printing both upper and lower case (*Pause*)

W: an upper- and lower-case print chain

M: a reader for paper tapes which have been punched (*Pause*)

W: a punched paper-tape reader

Exercise 4 (continued)

M: a unit which gives random access to magnetic discs (*Pause*)

W: a random-access magnetic disc unit

M: a device for controlling the speed of magnetic tape (*Pause*)

W: a magnetic-type speed control

M: a terminal which gives on-line access to a computer (*Pause*)

W: an on-line computer terminal

M: a small digital computer for general purposes (*Pause*)

W: a small general-purpose digital computer

Exercise 5

Repeat these please:

1. 1.603×10^9 bits

one point six nought three times ten to the nine bits

2. an XYZ 1608/40 computer

an X Y Z sixteen O eight stroke forty computer

3. $W(r + 1) = W(r) + \max(0, x, -z)$

W r plus one equals W r plus max nought x minus z

4. $\bar{x} = \sum x/n$

   x bar equals sigma x over n

5. $v_r = v_0 - ar$

   v r equals v nought minus a r

6. If $Z_0 > Z_1$ and $Z_1 > Z_2$, then $Z_0 > Z_2$

   If Z nought is greater than Z one and Z one is greater than Z two then Z nought is greater than Z two

7. $\log_2 10^6 = 6 \log_2 10$

   log of ten to the six to the base two equals six log ten to the base two

10 LASERS

Exercise 1

Example:

Woman: An excited electron emits radiation.
The electron falls to a lower energy level.

Man: When an excited electron emits radiation, the electron falls to a lower energy level.

W: An excited electron emits radiation.
The electron falls to a lower energy level. (*Pause*)

M: When an excited electron emits radiation, the electron falls to a lower energy level.

W: Atoms are excited.
Atoms emit or absorb quanta of equal energy. (*Pause*)

M: When atoms are excited, they emit or absorb quanta of equal energy.

W: A laser beam strikes living tissue.
The tissue is damaged. (*Pause*)

M: When a laser beam strikes living tissue, the tissue is damaged.

W: A laser beam strikes a mirror.
The beam is reflected. (*Pause*)

M: When a laser beam strikes a mirror, the beam is reflected.

W: The atoms of a laser emit radiation.
All the emissions are simultaneous and of equal energy.
(*Pause*)

M: When the atoms of a laser emit radiation, all the emissions are simultaneous and of equal energy.

Exercise 2

Example:

M: We have to reduce the pressure in the tube.

W: The pressure in the tube has to be reduced.

M: We have to reduce the pressure in the tube. (*Pause*)

W: The pressure in the tube has to be reduced.

M: We have to adjust the input frequency. (*Pause*)

W: The input frequency has to be adjusted.

M: We shall have to solve these equations by computer.
(*Pause*)

W: These equations will have to be solved by computer.

M: You'll have to double the power of the laser beam.
(*Pause*)

W: The power of the laser beam will have to be doubled.

Exercise 2 (continued)

M: You'll have to screen the target area. (*Pause*)

W: The target area will have to be screened.

M: They'll have to determine the optimum wavelength. (*Pause*)

W: The optimum wavelength will have to be determined.

Exercise 3

Repeat these formulae:

1. $1\ \text{Å} = 10^{-8}\ \text{cm}$

   one Angstrom unit equals ten to the minus eight centimetres

2. 4000 Å

   four thousand Angstrom units

3. $\lambda = 10^{4}\ \text{cm}$

   lambda equals ten to the four centimetres

4. 0.03–1.4 Å

   nought point nought three to one point four Angstrom units

5. $V = 2.998 \times 10^5$ km/sec

   V equals two point nine nine eight times ten to the five kilometres per second

6. $t = 3 \times 10^{-15}$ sec

   t equals three times ten to the minus fifteen seconds

7. $\mu = \sin i / \sin r$

   mu equals sine i over sine r

8. $\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$

   one over v plus one over u equals one over f

9. X-rays, γ-rays

   x-rays gamma-rays

10. $\alpha = 3.20 \pm 0.12$

    alpha equals three point two nought plus or minus nought point one two

11 STATISTICS

Exercise 1

Example:

Man: $y \leqslant 0.03$ when $x \geqslant 5$. (*calculate*)

Woman: It has been calculated that y is less than or equal to 0.03 when x is equal to or greater than 5.

M: $y \leqslant 0.03$ when $x \geqslant 5$. (*calculate*) (*Pause*)

W: It has been calculated that y is less than or equal to 0.03 when x is equal to or greater than 5.

M: $p + q = 1$. (*given*). (*Pause*)

W: It has been given that p plus q equals 1.

M: $p^{10} < 0.001$. (*estimate*) (*Pause*)

W: It has been estimated that p^{10} is less than 0.001.

M: $p > q$. (*assume*) (*Pause*)

W: It has been assumed that p is greater than q.

M: $f(t) = 1/t$. (*prove*) (*Pause*)

W: It has been proved that $f(t)$ equals 1/t.

M: $f(x) \to 0$ as $x \to \infty$. (*verify*). (*Pause*)

W: It has been verified that function x tends to zero as x tends to infinity.

M: x and y are independent. (*believe*) (*Pause*)

W: It has been believed that x and y are independent.

M: The difference is significant at the 5 % level. (*show*) (*Pause*)

W: It has been shown that the difference is significant at the 5 % level.

M: the unbiassed estimate of σ^2 is $s^2/(n-1)$. (*explain*) (*Pause*)

W: It has been explained that the unbiassed estimate σ^2 is $s^2/(n-1)$.

M: y is a lognormal variate. (*think*) (*Pause*)

W: It has been thought that y is a lognormal variate.

Exercise 2

Example:

W: Will all subscribers try to telephone simultaneously? (*possible*)

M: It's possible that all subscribers will try to telephone simultaneously.

W: Will all subscribers try to telephone simultaneously? (*possible*) (*Pause*)

Exercise 2 (continued)

M: It's possible that all subscribers will try to telephone simultaneously.

W: Will all subscribers try to telephone simultaneously? (*improbable*) (*Pause*)

M: It's improbable that all subscribers will try to telephone simultaneously.

W: Shall we get only one call in the first hour? (*probable*) (*Pause*)

M: It's probable that we shall get only one call in the first hour.

W: Will the number of 'heads' exactly equal the number of 'tails'? (*unlikely*) (*Pause*)

M: It's unlikely that the number of 'heads' will exactly equal the number of 'tails'.

W: Can I win a lottery twice in succession? (*possible but highly improbable*) (*Pause*)

M: It is possible but highly improbable that you can win a lottery twice in succession.

Exercise 3

Say these now:

M: The probability that a tossed coin shows 'heads' in n successive throws is $(1/2)^n$. (*Pause*)

W: The numerical sequence 1, 2, 3, 4, . . . can be continued indefinitely, without limit; such a sequence is infinite. (*Pause*)

M: The binomial expansion of $(q + p)^n$ is finite when n is an integer; the number of terms in the expansion is $(n + 1)$. (*Pause*)

W: As the value of x tends to c the value of the expression $x - c/x^2 - c^2$ tends to $\%_0$, which is indefinite. (*Pause*)

M: If the common factor $(x - c)$ is first cancelled, the fraction reduces to $1/x + c$ and its value tends to the definite value $1/2c$ as x tends to c. (*Pause*)

Exercise 4

Repeat these:

1. $\mu = np, \sigma = \sqrt{npq}$

   mu equals n p sigma equals root n p q

2. $p = p_1 + p_2 - p_1p_2$

   p equals p one plus p two minus p one p two

3. $p(t) = q^{t-1}p$

   p t equals q to the t minus one times p

4. $P\{a < x < b\} = \int_a^b f(x)\,dx$

   the probability that x lies between a and b is equal to the integral from a to b of f x d x

Exercise 4 (continued)

5. $\bar{x} = \frac{1}{n} \sum_{r=1}^{n} x_r$

x bar equals one over n sigma from r equals one to n of x r

6. $s^2 = \frac{1}{n-1} \sum_{r=1}^{n} (\bar{x} - x_r)^2$

s squared equals one over n minus one sigma from r equals one to n of x bar minus x r all squared

7. $y = \frac{1}{\sigma\sqrt{2\pi}} e^{-x^2/2\sigma^2}$

y equals one over sigma root two pi e to the minus x squared over two sigma squared

12 TELECOMMUNICATIONS

Exercise 1

Example:

Woman: The disc, rotating on a vertical axis, scanned the horizon.

Man: Rotating on a vertical axis, the disc scanned the horizon.

W: The disc, rotating on a vertical axis, scanned the horizon. (*Pause*)

M: Rotating on a vertical axis, the disc scanned the horizon.

W: The waves, reflected from a paraboloidal mirror, converge to a focus. (*Pause*)

M: Reflected from a paraboloidal mirror, the waves converge to a focus.

W: The signals, their power steadily decreasing, were soon lost in the noise. (*Pause*)

M: Their power steadily decreasing, the signals were soon lost in the noise.

W: The system, transmitting on 100 independent channels, has become overloaded. (*Pause*)

Exercise 1 (continued)

M: Transmitting on 100 independent channels, the system has become overloaded.

W: The waves, diverging from the source, are transmitted in a parallel beam by reflection from the paraboloidal dish. (*Pause*)

M: Diverging from the source, the waves are transmitted in a parallel beam by reflection from the paraboloidal dish.

W: Each carrier, transmitting up to 132 telephone channels, is monitored separately. (*Pause*)

M: Transmitting up to 132 telephone channels, each carrier is monitored separately.

W: A microwave link, extending the satellite circuits, connects Goonhilly to the Telephone Centre in London. (*Pause*)

M: Extending the satellite circuits, a microwave link connects Goonhilly to the Telephone Centre in London.

Exercise 2

Example:

M: There are new problems which arise from the carrying of signals or messages.

W: There are new problems arising from the carrying of signals or messages.

M: There are new problems which arise from the carrying of signals or messages. (*Pause*)

W: There are new problems arising from the carrying of signals or messages.

M. The wires were replaced by cables which each contained many pairs of wires. (*Pause*)

W: The wires were replaced by cables each containing many pairs of wires.

M: The signal is split into its original components which enables the input messages to be switched to their destinations. (*Pause*)

W: The signal is split into its original components enabling the input messages to be switched to their destinations.

M: Microwaves behave in much the same way as visible light which travels in straight lines. (*Pause*)

W: Microwaves behave in much the same way as visible light travelling in straight lines.

M: Exchanges which connect automatically all stages of local and long-distance calls have been developed. (*Pause*)

W: Exchanges connecting automatically all stages of local and long-distance calls have been developed.

Exercise 3

Now repeat these:

1. $E = \mu_0 Hc$

   E equals mu nought H c

Exercise 3 (continued)

2. $H = \varepsilon_0 Ec$

   H equals epsilon nought E c

3. $\frac{E}{H} = \sqrt{\frac{\mu_0}{\varepsilon_0}}$

   E over H equals root mu nought over epsilon nought

4. $c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}}$

   c equals one over root mu nought epsilon nought

5. $E_t = E \sin(\omega t - \beta r)$

   E t equals E sineomega t minus beta r

6. $R = K\pi^2 l^2 / \lambda^2$

   R equals K pi squared l squared over lambda squared

7. $H = \frac{l \sin \theta}{\lambda r} I_{max}$

   H equals l sine theta over lambda r times I max

8. $f_0 = \frac{1}{\lambda \sqrt{LC}}$

   f nought equals one over lambda root L C

9. $\frac{P_s}{P_c} = \frac{1}{2} m_a^2$

   P s over P c equals one half m a squared

10. $$m_f = \frac{\omega_c \text{ max} - \omega_c}{\omega_m}$$

m f equals omega c max minus omega c all over omega m

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These oral exercises have been prepared for use as a complement to the recorded series 'Scientifically Speaking' with its accompanying textbook. They illustrate most of the structures studied in 'Scientifically Speaking', and provide further practice in the pronunciation of scientific formulae. Reference to the section *Structures of Scientific English* is particularly useful.

The exercises are designed to be used with the help of this booklet as it was considered that the length of the examples and their difficulty would make a text necessary for most students. But when the exercises have been completed several times, students should be able progressively to dispense with a text.